



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
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NEW YORK, NY 10007-1866

JUL 26 2019

Robert Mancini
Project Manager, Refining Business Unit
Chevron Environmental Management Company
1200 State Street
Perth Amboy, New Jersey 08861

Re: Monitored Natural Attenuation Implementation Workplan, dated September 28, 2018
Former Chevron Perth Amboy Facility
Perth Amboy, Middlesex County, New Jersey
EPA ID #: NJD081982902

Dear Mr. Mancini:

The U.S. Environmental Protection Agency (EPA) Region 2 and the New Jersey Department of Environmental Protection (NJDEP) have completed our review of the Monitored Natural Attenuation (MNA) Implementation Workplan (IWP), dated September 28, 2018 and submitted for the Former Chevron Perth Amboy Facility in Perth Amboy, Middlesex County, NJ. The September 2018 MNA IWP was submitted by Chevron Environmental Management Company pursuant to the Resource Conservation and Recovery Act (RCRA), Hazardous and Solid Waste Amendments (HSWA) Permit of 2013, and the Technical Requirements for Site Remediation (TRSR), N.J.A.C. 7:26E. We have the following comments:

General Comments

1. The document repeatedly states throughout that, "...benzene has been determined to be representative of the VOCs for the facility. As such benzene will be discussed in this document as an analog for all petroleum hydrocarbons VOCs present in the groundwater." We are concerned that an evaluation of MNA focused solely on benzene, may not be representative of true site conditions. A review of other site documents indicates that contaminants of concern (COCs) such as tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), vinyl chloride, total xylenes, toluene, ethylbenzene, cyclohexanes, 2,4-dimethylphenol, phenol, 2-methylnaphthalene, naphthalene, and volatile/semi-volatile organic compounds (VOC/SVOC) tentatively identified compounds (TICs), were detected where benzene was not, or where benzene was detected below the 2013 HSWA Permit Corrective Measure (CM) level of 100 ug/l. For example, Appendix Table A2-East Yard, denotes benzene concentrations at less than 2 ug/l in MW-155 in AOC 29 prior to 2012. However, a review of other documents indicates that SVOCs were detected in replacement well MW-155R at concentrations up to 5,000 ug/l for naphthalene, at 570 ug/l for 2-methylnaphthalene, and 690 ug/l for 2,4-dimethylphenol. Since MNA is to be final remedial action for groundwater at the site, it must be applicable to all COCs. The document should be revised provide a better understanding of groundwater contaminant concentrations for all VOCs and SVOCs which may or may not be addressed by MNA processes. The document should clarify locations (AOCs/SWMUs) where COCs not co-located with benzene may also be undergoing MNA, referencing what additional monitoring may be conducted in these areas.

2. Though Section 4.1 and subsequent subsections provide a summary of the historic distribution and changes in benzene concentrations for each Yard, the discussion appears to be focused solely on impacts to shallow groundwater and does not consider impacts to deeper groundwater. A further review of the groundwater data from this and other documents suggest that there are a number of deep groundwater wells that have VOC and SVOC impacts including but not limited to deep wells at SWMU 35 (MW-403), AOC 31 (multiple locations), and other AOCs/SWMUs. Though some deep well information (MW-403 historic data) is incorporated into the document, it is difficult to review as the data tables in Appendices A, B and C do not reference sample depth or differentiate between aquifer zones (shallow versus deep). We believe that a discussion of deep groundwater should be included in the MNA assessment as vertical plume migration and attenuation is as much of a concern as horizontal plume migration. A comparison of the information presented in Figure 4 (which list deep or shallow wells) to Appendix A, suggests that several deep wells were impacted by benzene and other COCs, including but not limited to: MW-246R, MW-250, MW-275, MW-283, MW-287, MW-293/293R, MW-178, MW-180, MW-184, MW-403, etc. Several of these wells were abandoned during CM activities, and since post CM data is not available, we are concerned that impacts to deep groundwater are ongoing. Chevron should clarify if additional evaluation will occur at AOCs/SWMUs where impacts were noted in deep groundwater and including the wells listed above. Furthermore, based on a review of the Figure 4 and Appendix A, we find that no analytical data was provided for the following deep wells: MW-533, MW-513, MW-514, MW-515, MW-531, MW-531, MW-476, MW-500, MW-506, MW-525, MW-526. As such, it is unclear if additional evaluation is warranted at these AOCs/SWMUs in the deeper groundwater in regards to MNA. The document should be revised to provide additional discussion on the impacts to shallow and deep groundwater, and propose additional monitoring as part of the MNA IWP for each. We also recommend that additional figures, similar to Figures 8 through 10, be included in the revised document to aid in the evaluation of historic and current impacts to deep groundwater.

Section Specific Comments

3. Section 4.1.2 Historic Decreases in Contaminant Concentrations Over Time, Central Yard,

Page 12: The document states, "In the southern plume, near AOC 36...enhanced in-situ bioremediation (EISB) was conducted...benzene concentrations have been reduced from greater than 100 ug/l..."

However, a review of past documents indicates EISB was implemented to address chlorinated VOCs at AOC 36 which are the principal COCs in groundwater and not benzene. As noted above, the document should clarify what other COCs will or won't be addressed by the MNA and include them in an evaluation of the organic contaminant load.

4. Section 4.1.2 Historic Decreases in Contaminant Concentrations Over Time, Main Yard, Page

12: The document states, "Currently, only three of these areas have groundwater concentrations over 1,000 µg/L, and nine areas have benzene concentrations above the CMI action limit of 100 µg/L..." The document should be revised to clarify the AOCs/SWMUs where benzene was detected over the CMI action level.

5. Section 4.1.2 Historic Decreases in Contaminant Concentrations Over Time, Main Yard, Page

12: The document states, "The "Main Yard Plume" includes a large commingled plume, which extends from SWMU 5/21/43 in the northwest to AOC 15/8 in the southeast." However, we find that this section is lacking in detailed information about all AOCs/SWMUs that have been remediated within this larger plume, specifically AOC 23/41 and SWMU 18. We acknowledge that recent remedial activities associated with or near AOC 23/41 and SWMU 18 may have greatly improved the groundwater quality in this area. However, a review of Figure 8 (detailing 2008) and Figure 9 (detailing 2017/2018) suggest that many of the monitoring wells abandoned during implementation of the CM have not been replaced, as such that there is limited data to support the representation of improved groundwater quality in Figure

9. Figure 8 depicts numerous wells near AOC 23/41 and SWMU 18 where benzene was detected above 10 ug/l including two wells where benzene was detected above 1,000 ug/l (MW-117 and MW-260). However, only one well remains (MW-263) in this area at a distance from the area of greatest impacts. Please clarify if post remedial groundwater sampling will be or has been conducted in the area near former wells MW-117 and MW-260 to confirm improvement of water quality in this area as depicted on Figure 9 in the Main Yard.

6. Section 4.3.1 MNA Parameters: Data Assessment, Central Yard, Page 18: The document states, "Sulfate concentrations were reported to be between 38,700 and 54,000 ug/l..." for MW-360 a "periphery monitor well". The document further states, "The cause of the consistently-elevated sulfate concentrations in MW-360 is unclear." Please note, we were unable to find the corresponding data set for MW-360 to further evaluate this statement. Regardless, the document should clarify, what, if any, additional remedial actions have been conducted in this area (or in adjacent AOCs/SWMUs) that could be the cause, and what, if any, long-term impacts this may have on MNA in this area.

7. Section 4.3.1 MNA Parameters: Data Assessment, Central Yard, Page 19: The document references that MNA was already evaluated as a remedial approach for AOC 36, and that additional information can be found in other documents. This document should be revised to also include the above referenced information, specifically as it relates to impacts to MNA due to the presence of chlorinated VOCs (CVOCs) as part of the organic contaminant load at AOC 36, and for other AOCs/SWMUs. Furthermore, a discussion of AOC 36 should also reference impacts on MNA (if any) due to the placement of the Laddertrack Rail System which includes a capping system and a spill/discharge collection component which limits infiltration in this area.

8. Section 4.3.1 MNA Parameters: Data Assessment, East Yard, Page 20: The document states, "The East Yard also experiences possible tidal influences, since the eastern boundary is the Arthur Kill." The document should clarify the phrase "possible tidal influences". Furthermore, since tidal influences could be associated with deteriorated bulkheads, we recommend a bulkhead integrity assessment be conducted.

9. Section 4.4.2 Average Biodegradation Rates for COCs Documented in Numerous Case Studies, Page 23: The document indicates that there are "several factors that can significantly impact the rate of biodegradation for any particular hydrocarbon, including...the presence of other, non-hydrocarbon co-contaminants..." However, the document does not address these other co-contaminants. The document should be revised to provide a discussion on all COCs including VOC and SVOC TICs.

10. Section 4.4.4 In-situ Microcosms (Bio-Traps®), Page 24: The document states that the beads will be "baited" with an isotopically labeled target compound (benzene)". Please clarify if the beads will be "baited" with a similar concentration of benzene to what has already been detected in the groundwater where this will be implemented.

11. Section 4.4.4 Quant-Array (Petroleum) Analysis, Page 26: The document states this analysis looks at "22 genes...that are associated with a variety of aerobic and anaerobic benzene-degradation pathways." However, it is also suggested that bioattenuation of other compounds may be complimentary to or in competition with benzene-specific bioattenuation. The document should be revised to clarify this statement. Regardless, this statement further our concerns regarding the limiting this MNA evaluation solely to benzene. As such, we recommend as part of the MNA process monitoring that, at a minimum, full organic analyses (VOC+TICs, SVOC+TICs) be included in the evaluation, where appropriate such as at AOC 36.

12. Section 5.3 Institutional Controls, Page 31 and Table 1, GWQS: The document states, “The facility is in a Class-IIA aquifer and groundwater quality standards (GWQS) are summarized in Table 1. Table 1 denotes that the GWQS were last amended in January 16, 2018. However, further review of the table indicates that 1,4-dioxane among others COCs was not included. Please confirm that Table 1 GWQS is complete and up-to-date.

13. Section 6.1 Data Gaps, Page 32: The document states, “Some of these identified data gaps can be addressed while CM activities are occurring; however, others will need to wait until CM implementation completion has been achieved.” In addition to the data gaps referenced in this section, we also believe that additional evaluation of certain site conditions which may influence MNA processes are also warranted, including but not limited to: impacts as a result of EISB treatment, impacts or change in site conditions due to the installation of the Permeable Reactive Barrier SWMU 34 or similar site disturbances, excavations and in-situ stabilization (ISS) activities; changes in surface cover, or installation of structures that limit infiltration and groundwater flow (i.e. Ladder Track Rail System, bulkheads, cover systems), etc. The document should be revised to include additional discussion on data gaps and site activities/structures that may or change inhibit the flow of groundwater and surface infiltration.

14. Section 6.2 Performance Monitoring, Page 33, and Appendix C: The document states, “Groundwater monitoring will continue to be conducted to determine the concentrations and distribution of contaminants, geochemical parameters, and MNA related parameters (e.g., alkalinity, pH ORP, sulfides, dissolved iron, total iron, DO, and nitrates).” However, Appendix C suggests that only VOCs will be included in this process monitoring. We recommend, at a minimum, that the baseline sampling be more extensive and include VOC+TICs and SVOC+TICs. Future sampling may include a reduced list of based on the information collected in baseline sampling. In addition, please clarify why sulfates were not included in the list of MNA related parameters, and incorporate as necessary.

15. Section 6.2 Performance Monitoring, Page 33 : The document states, “This will make data evaluations more accurate by eliminating variables such as...disturbances due to high purge rates used for other COCs.” Please clarify this statement and if sampling for MNA parameters will be collected via the low flow sampling method that is typically used for inorganics.

16. Section 6.3 MNA Corrective Measures Completion, Page 35: The document states, “An NFA request will be made when an area has maintained benzene concentrations under 1 µg/L for four consecutive sampling events.” As noted above, other COCs need to be evaluated and confirmed to be below all applicable GWQS before we will consider no further action regarding MNA at the site.

17. Section 7.2 Documentation Requirements, Page 36: The document indicates that the CM progress report will contain information specific to MNA sampling events. However, we were unable to locate the “groundwater sampling form” referenced in the Field Sampling and Analysis Plan (FSAP). To properly evaluate MNA and associated groundwater analytical data, we request that all information necessary to evaluate the sample data set be included in the progress reports, including but not limited to: water level measurements before/during/after purge and prior to sampling; purge rate (start and end time); and sample start and end times. Please note, we find this information necessary to interpret any potential well purge/recovery issues which may impact data collected.

18. Appendix A, B and C Tables: We have evaluated Appendices A, B and C and notes the following:

- a. Appendix A tables should be revised at a minimum to include VOC TICs, if available. Furthermore, SVOC and SVOC TICs should also be included for the subset of well locations where the data indicates SVOC impacts.
- b. Appendix C tables should be revised to include a more comprehensive baseline sampling set including: VOC TICs and SVOC and SVOC TICs, where applicable. Subsequent long-term monitoring can be modified based on data collected during baseline sampling.
- c. Appendix C table for the East Yard should be revised to include MNA process monitoring at MW-155R for SVOC+TICs.
- d. The tables in Appendix A, B and C should be revised to reference the aquifer zone that the well monitors (shallow or deep), and the SMWU/AOC designation.
- e. Finally, the document, should be revised to include a well construction summary table for any wells referenced in Appendices A, B or C that will be used to evaluate MNA at the site.

Should you have any questions or would like to discuss this matter further, I can be reached at 212-637-3703, or via email at vargas.ricardito@epa.gov.

Sincerely,



Ricardito Vargas
Project Manager
Land and Redevelopment Programs Branch

cc: Charles Zielinski, NJDEP (electronic copy only)

